



Space Sustainment

A New Approach for America in Space

Lt Col Kris Barcomb, USAF

Eisenhower was surely right—the American system was not set up for central planning, nor did its values condone it.

—Walter McDougall

Introduction

Promoting commercial development and fostering free-market capitalism are cornerstones of American economic policy. Since its inception, the United States has favored decentralization and privatization as the primary means of generating wealth. These fiscal core values should permeate all aspects of US policy, yet the history of American activity in space seems to indicate otherwise. Accessing and exploiting space involves highly specialized technologies, astronomically high costs, and considerable risk of failure. In the formative years for space, these technological factors coincided with an existential threat to the United States and its allies, emerging from within the Soviet technocracy. The perceived successes of the Soviet Union's centralized approach to advanced research and development cast doubt on the ability of free markets to maintain a competitive edge.¹ This combination of technological complexity and geopolitical pressure drove the

Disclaimer: The views and opinions expressed or implied in the *Journal* are those of the authors and should not be construed as carrying the official sanction of the Department of Defense, Air Force, Air Education and Training Command, Air University, or other agencies or departments of the US government. This article may be reproduced in whole or in part without permission. If it is reproduced, the *Air and Space Power Journal* requests a courtesy line.

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE DEC 2014		2. REPORT TYPE		3. DATES COVERED 00-00-2014 to 00-00-2014	
4. TITLE AND SUBTITLE Space Sustainment: A New Approach for America in Space				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Research Institute (AFRI), Air and Space Power Journal, 155 N. Twining Street, Maxwell AFB, AL, 36112				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 13	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



United States to break from its laissez-faire traditions and replace them with an ideology of control that has permeated the fabric of America's attitude toward the ultimate high ground ever since.

This philosophy must change. Fifty years of experience and a dramatically different global political climate have altered the conditions under which the current control-oriented system emerged. Many commercial space companies are on the cusp of fiscal viability or are already sustaining profits.² The Cold War ended, and the United States arose as the world's dominant space power. Space technology has improved, and new markets are emerging. Despite these changes, legal barriers in both international and domestic law continue to inhibit economic growth and competition, and the international community lacks a viable mechanism for ensuring order and promoting a rule of law in space.

Given these realities, the United States should extend its commitment to free markets into the space domain by rethinking its space strategy. In this paper, I advocate doing so by adopting a mind-set of *space sustainment* over the current paradigm of *space control*. A space sustainment strategy leverages US strengths to promote and maintain an international order sufficient to preserve a dynamic, functional, and growth-oriented marketplace for space activity. It includes a recommitment to traditional US economic principles and begins by modifying restrictive laws and fostering capitalism. It also acknowledges the need for defending private and public equities in space through all instruments of national power, including exercising legitimate uses of force for maintaining order within the boundaries of the rule of law. Finally, this strategy embraces transparency to enhance predictability for private enterprise and to preserve the credibility of actors within the emerging international legal framework. Adopting this approach will improve the overall security of the United States, promote a healthy economy, and increase access to force support and enhancement capabilities needed for promoting the rule of law. Further, it will enable the United States to maintain



its technological, military, and economic advantages despite a space domain that is increasingly “congested, contested, and competitive.”³

Reforming Space Law

The current body of both international and domestic space law inhibits private enterprise, making it difficult for Air Force Space Command (AFSPC) and other government agencies to access space capabilities at affordable costs and within reasonable risk limits. Everett Dolman, author of *Astropolitik*, challenges the notion that space should be treated in a communal fashion. He attests, “The core problem in international space law is that the practical effect of collectivizing space has been counter to its intended purpose of encouraging the development of outer space. Indeed, it would seem to have had precisely the opposite effect.”⁴ Dolman’s primary target for reform is the Outer Space Treaty (OST), since so many countries have ratified it, but he also highlights the significant problems with other legal frameworks, such as the Bogota Declaration and the Moon Treaty. Both of the latter agreements promote an idealistic interpretation of space as a purely public domain—a *res communes*, more in line with communism than capitalism.⁵

Lewis Solomon, a law professor at George Washington University, also aims to counter commercially stifling trends in international law. While he views the verbiage in the OST as uncertain, he sees the Moon Treaty as undeniably prohibitive. He writes, “By precluding private property rights and profits, [the Moon Treaty] negates the impetus for commercial development of the Moon. Simply put, the Moon Treaty is unacceptable to space-faring nations in light of the risks involved in getting to the Moon and extracting its resources.”⁶ The United States should embrace its traditional economic values and press the international community toward promoting market incentives in international space law. This would open up the competitive space for new entrants, increase the supply of vendors, and ultimately reduce cost and risk.



The restrictions contained in the current body of international law are not the only barriers the United States must overcome to successfully implement a space sustainment strategy. US export controls on dual-use aerospace technology, such as those contained in the International Traffic in Arms Regulations (ITAR), have often backfired “as other countries eagerly pick up the slack created by US market withdrawal.”⁷ By viewing space solely from the perspective of national security and failing to predict the economic consequences, protectionist regulation pushed markets overseas and forced other nations to develop indigenous capabilities. For example, self-imposed restrictions on domestic launch service providers allowed the European Space Agency’s Arienne rocket, which did not enter the market until 1980, to capture 50 percent of worldwide commercial business by 2001.⁸ In addition to the growth of non-US launch service suppliers, nations are creating their own capabilities for space navigation, earth observation, communication, and space exploration.

In addition to the loss of business, US companies also face harsh penalties for violating these regulations—whether the infringement was intentional or not. The United States severely penalized Hughes and Loral under the Cox Committee for allegedly helping the Chinese identify and overcome engineering deficiencies associated with the Long March rocket.⁹ Fearing additional retribution, the aerospace industry has shied away from further developing international business opportunities to the extent they could if these prohibitions did not exist. These unfortunate conditions have led to a sharp decline in US space-related exports and a surge in international competition.

Paradoxically, the regulations designed to protect US technology created new international markets based solely on avoiding US export controls. Many foreign businesses offering space services eliminated all US subcontractors from their supply chains and began lucratively advertising themselves as “ITAR-free.”¹⁰ In some cases, these restrictions had the opposite effect of spawning new technologies equal to or better than those available from US suppliers.¹¹ In light of international ad-



vances in space technology and the associated increase in foreign availability of components, the Department of Defense (DOD) has at least acknowledged the need to review US export controls.¹² Without reform, the current body of regulation will continue to be detrimental to the health and welfare of the industrial base, especially lower-tier suppliers. Revising these laws will enable US firms of all sizes to compete more successfully in a global economy increasingly capable of independently producing advanced technologies.¹³

The primary strength of the US economy has always been its ability to continuously innovate. Protectionism fosters complacency, and complacency kills innovation. Therefore, the United States should enact domestic legal frameworks that foster its competitive edge rather than endeavoring to stifle global technological progress out of fear that the country may not be able to retain its historical advantage. The United States should trust its capacity to overcome challenges and not attempt to isolate itself from them. The bedrock of a space sustainment strategy is creating the conditions and incentives necessary for economic growth. It embodies a positivistic philosophy of sustained, continuous achievement through adaptation and innovation over the negative objective of focusing on the false hope of endlessly eliminating competition. AFSPC should be a leading advocate for this legal reform since it will be a primary recipient of the benefits that a healthy industrial base provides.

Defending Space Equities

Successfully promoting private industry requires a mechanism for protecting equity in space. This fact requires nations to analyze and agree, at least implicitly, upon the methods actors may employ to protect their investments and their livelihood. Current policy, such as the 2010 *National Space Policy* and the 2011 *National Security Space Strategy*, approaches the problem of defending space equities from the perspective of exercising the inherent right of self-defense.¹⁴ The United States asserts that military force may be required to deter and possibly defeat



hostile actions taken against its own assets or those of its allies. While the right of self-defense will not go away, it may not be the only standard the United States should apply when considering future space operations.

For example, the legitimacy of police forces and their associated activity derives from the need to ensure social order. The use of force in a law enforcement context is not relegated solely toward self-defense, and the amount of force applied in a situation is dependent on the “amount of effort required by police to compel compliance by an unwilling subject.”¹⁵ Governments could apply this same standard to the space domain such that the use of force could be considered legitimate not only in the context of self-defense but also as a method for enforcing order.

If one agrees that force is appropriate for promoting order in space, then the next logical question becomes, who should be responsible for applying that force? The international community is not yet ready to answer that question in a formal sense, but that does not mean individual states cannot or will not assume that role on their own. If one takes the view of international relations as an “anarchical society,” the United States, by virtue of its overwhelming capability, must resort to self-help behavior and “take upon [its] own shoulders the responsibility of determining that there has been a breach of the rules, and of attempting to enforce them.”¹⁶ Despite many mistakes, the United States has handled its hegemony to promote international order in a more positive way than has been typical of other significant powers in history. As Dolman remarks, the United States is “the most benign state that has ever attempted hegemony over the greater part of the world.”¹⁷ Mike Moore, author of *Twilight War*, expresses a similar view of the US record of accomplishment:

“The fact that the United States over the past sixty-plus years has not used its extraordinary economic and military might to build a classic do-as-we-say-or-face-the-consequences global imperium makes America an exceptional nation when judged by the miserable standards of world history. To be sure, the United States works diligently, either overtly or covertly, to make things go



its way. That has been true of all great powers in the history of the world. But America does not attempt to run the world like a modern-day Rome.”¹⁸

While the preceding discussion helps demonstrate why the United States should assume the role of the primary custodian for maintaining order in space, it is obvious that implementing this aspect of a space sustainment strategy will be difficult. One difficulty stems from the military controlling, or at least maintaining significant influence over, the predominance of space capabilities. Terrestrially, observers can often divide the control of geographic territory into police forces for suppressing internal threats to order and military forces for defending against external threats. This makes for a relatively clean division of roles and responsibilities. Since space is inherently global, no such clear demarcations between law enforcement and military activity exist. From an international perspective, observers cannot easily distinguish the actions of military forces used in a self-help capacity to uphold the rule of law from those of conquest. Therefore, the use of military forces to police behavior in space may make it difficult for the international community to determine if the intent of those actions is to sustain the greater good or to seize a position of advantage.

Dolman also analyzes the role of power in space but overstates the appropriate role of force in promoting economic growth and protecting private interest. He states, “What is too little understood by advocates of the free market is that while economic monopolies destroy the market, a monopoly of power is essential to its success.”¹⁹ While this is true from the perspective that it would be counterproductive to have, for example, competing police forces within the same jurisdiction or more than one rule of law within a given country, one must be careful not to allow the monopoly of power to exceed its proper objective. The monopoly of power must be oriented toward facilitating economic growth and protecting private equity. It must not become an end unto itself by attempting to assert control over the direction of the market.

The global nature of space effects presents a second difficulty. In terrestrial domains, the violence employed by either police forces or



militaries is generally localized to the contested area. In space, aggressive behavior often has lasting, global consequences. The 2,200 pieces of orbital debris caused by the 2007 Chinese antisatellite demonstration is illustrative of this point.²⁰

If commercial interests are to flourish in space, then an acceptable international rule of law will have to emerge from the existing anarchy. The United States is currently the only nation postured to take on the responsibility—largely due to the existing and future capabilities that AFSPC and its government partners provide. It is also the nation most reliant on space. In this sense, the United States has both the capacity and the incentive to sustain the space environment for peaceful commerce. Yet, given the current inability to distinguish between military and police actions in space, the international community is not likely to accept US unilateral behavior. Therefore, the United States should adopt a space sustainment strategy aimed at defending space in partnership with other nations to foster legitimacy. Transparency will be the foundation of these partnerships.

Enhancing Transparency

As Joan Johnson-Freese, a professor at the Naval War College, plainly states, “We need more and better information about what is going on in space.”²¹ Much of the existing international legal framework for space emerged from both the desire and the capability to monitor behavior. During the Cold War, nuclear deterrence rested on a careful balance of power. After tense negotiations, both sides came to understand that some amount of transparency was required to minimize the risk of starting a nuclear war. The first attempts at transparency were discouraging. Soviet leader Nikita Khrushchev rejected Pres. Dwight D. Eisenhower’s call for “Open Skies.”²² He could not accept US aircraft in Soviet airspace, but due to an inability to strike a satellite in orbit and the precedence set by Sputnik, he tolerated reconnaissance from space. In 1972, following the Strategic Arms Limitations Talks, both sides codified the importance of employing national technical means



for nuclear treaty verification into the vernacular of the Cold War.²³ They accepted the need to cede some amount of secrecy and sovereignty for the larger objective of promoting security and international stability. While most surveillance has historically dealt with terrestrial activity, it is likely to expand toward monitoring space assets as well.

Transparency is a precondition of effective and legitimate international rule of law. In the future, both market competition and political disagreements will likely manifest themselves in space. Therefore, demand for AFSPC's space situational awareness (SSA) capabilities will continue to grow as the importance of monitoring space activity increases. Initially, this heightened awareness of space capabilities will cause alarm, just as Open Skies did in the 1950s. As before, nations will have to decide if revealing more about their capabilities (and potentially curtailing some forms of activity) for the greater good of international security is in their best interest. This decision could be especially difficult for the United States since it will likely be the primary financial backer of an international SSA capability and it could also have the most to lose from the perspective of secrecy. Despite these concerns, this will likely be the price of maintaining US leadership in space in the future.

As the historical evidence suggests, if the United States decides not to promote transparency in space, other nations will. In this scenario, the United States would lose credibility for not having participated in supporting the trend toward openness, jeopardizing the legitimacy of self-help behavior. The negative consequences could also spill over to US commercial entities, which would suffer economically if international competitors capture the market for SSA services.

Fortunately, the United States is already taking steps in this direction. The 2010 *National Space Policy* declares, "Space operations should be conducted in ways that *emphasize openness and transparency* to improve public awareness of government, and enable others to share in the benefits of space" (emphasis added).²⁴ Likewise, the 2011 *National Security Space Strategy* describes how the DOD "will continue to im-



prove the quantity and quality of the SSA information it obtains and expand provision of safety of flight services to US Government agencies, *other nations and commercial firms*" (emphasis added).²⁵ In line with this direction, Adm Cecil Haney, commander of United States Strategic Command (USSTRATCOM), recently testified before the Senate Armed Services Committee that

sharing SSA information with other nations and commercial firms promotes safe and responsible space operations, reduces the potential for debris-making collisions, builds international confidence in US space systems, fosters US space leadership, and improves our own SSA through knowledge of other owner/operator satellite positional data.²⁶

Similarly, Deputy Assistant Secretary of Defense for Space Policy Douglas Loverro highlighted before the House Armed Services Committee how USSTRATCOM has signed five SSA-sharing agreements with other governments—Australia, Japan, Italy, Canada, and France—and increased the number of agreements with commercial satellite operators to 41.²⁷ Finally, in early 2014, AFSPC commander Gen William Shelton took another important step forward toward transparency at the Air Force Association Air Warfare Symposium. During his speech, he announced that the USAF would send two Geosynchronous Space Situational Awareness Program satellites into orbit this year. Those satellites will augment the nation's ability to monitor satellites in geosynchronous orbit for collision avoidance and to detect potential threats.²⁸

Each of these recent examples from senior defense leaders highlights a growing trend toward more openness in space. Yet, for the foreseeable future, a healthy tension between security and transparency will persist in the minds of policy makers. While Admiral Haney enumerated the benefits of sharing SSA, he also acknowledged the risks when he said, "For all its advantages, there is concern that SSA data sharing might aid potential adversaries."²⁹ His struggle to define an appropriate balance between secrecy and openness is a modern reflection of President Eisenhower's dilemma with the Soviet Union and Open Skies. President Eisenhower shifted his emphasis toward open-



ness and ultimately achieved a more stable international order. A similar decision with respect to SSA may prove equally beneficial for the future of international order in space.

This focus on increased transparency is an important step toward adopting a space sustainment strategy that embraces improvements in the monitoring and sharing of international space activity. Transparency will promote the rule of law, support international stability, and enhance the legitimacy of policing forces. These conditions will also foster commercial innovation, development, and risk taking in space.

Conclusion

Khrushchev once said, "Those 'rotten' capitalists keep coming up with things which make our jaws drop in surprise."³⁰ Promoting jaw-dropping innovation through free-market capitalism should be the focus of US space policy. Competing on the merits of the US economy will serve America far better than adopting protectionism and isolationism. The space sustainment strategy outlined here advocates three distinct steps to help the United States continue to succeed in space. First, both international and domestic law should be modified. International law should clearly protect private property rights. Domestic law should reduce the barriers inhibiting US companies from competing internationally. It should foster domestic innovation through a vigorous free market empowered to outcompete, rather than attempting to suppress, international actors. Second, the United States must lead the international community toward policing strategies aimed at promoting and protecting international rule of law in space so that a commercial marketplace can operate safely. In doing so, careful distinctions must be made between military and police forces. Finally, transparency will be a key factor in establishing a legitimate legal framework for space. Therefore, the United States should continue to enhance SSA capabilities and develop international partnerships for sharing that information.



AFSPC will play a critical role in the transformation of the current mind-set toward this new paradigm. It will also be the agency most called upon to monitor activity and ensure order within the space domain. Its participation and advocacy are crucial for a space sustainment strategy's success. The results will enable the United States to maintain its leadership role in space and foster a peaceful climate for future commerce and international space activity. ★

Notes

1. Walter A. McDougall, *The Heavens and the Earth: A Political History of the Space Age* (Baltimore, MD: Johns Hopkins University Press, 1997), 6.
2. Lewis D. Solomon, *The Privatization of Space Exploration: Business, Technology, Law and Policy* (Oakland, CA: Transaction Publishers, 2011), 8–11.
3. Department of Defense, *National Security Space Strategy: Unclassified Summary* (Washington, DC: DOD, January 2011), 1, http://www.defense.gov/home/features/2011/0111_nsss/docs/NationalSecuritySpaceStrategyUnclassifiedSummary_Jan2011.pdf.
4. Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (Portland, OR: Routledge, 2002), 138.
5. *Ibid.*, 133.
6. Solomon, *Privatization of Space Exploration*, 111.
7. Joan Johnson-Freese, *Space as a Strategic Asset* (New York: Columbia University Press, 2007), 159.
8. *Ibid.*, 142–43.
9. *Ibid.*, 146, 162.
10. Peter L. Hays, "Space Law and the Advancement of Spacepower," in *Toward a Theory of Spacepower: Selected Essays*, ed. Charles D. Lutes et al. (Washington, DC: National Defense University Press, 2011), 312.
11. Joseph Fuller Jr. et al., "The Commercial Space Industry: A Critical Spacepower Consideration," in *Toward a Theory of Spacepower*, 111–12.
12. DOD, *National Security Space Strategy*, 3.
13. *Ibid.*, 7.
14. *Ibid.*, 10; and Executive Office of the President, *National Space Policy of the United States of America* (Washington, DC: Executive Office of the President, 28 June 2010), 3, http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf.
15. National Institute of Justice, "Police Use of Force," 20 January 2012, <http://www.nij.gov/topics/law-enforcement/officer-safety/use-of-force/Pages/welcome.aspx>.
16. Hedley Bull, *The Anarchical Society: A Study of Order in World Politics*, 3rd ed. (New York: Columbia University Press, 2002), 58.
17. Dolman, *Astropolitik*, 157–58.
18. Mike Moore, *Twilight War: The Folly of U.S. Space Dominance* (Oakland, CA: Independent Institute, 2008), 283.



19. Dolman, *Astropolitik*, 177.
20. James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford, CA: Stanford Security Studies, 2008), 53.
21. Johnson-Freese, *Space as a Strategic Asset*, 110.
22. McDougall, *Heavens and the Earth*, 127.
23. Ibid., 431.
24. Executive Office of the President, *National Space Policy*, 3.
25. DOD, *National Security Space Strategy*, 6.
26. Mike Gruss, "U.S. Space Assets Face Growing Threat from Adversaries, STRATCOM Chief Warns," *Spacenews.com*, 28 February 2014, <http://www.spacenews.com/article/military-space/39669us-space-assets-face-growing-threat-from-adversaries-stratcom-chief>.
27. House, *Testimony of Douglas Loverro before the House Committee on Armed Services Subcommittee on Strategic Forces*, 113th Cong., 2nd sess., 3 April 2014, http://www.armed-services.senate.gov/imo/media/doc/Loverro_03-12-14.pdf.
28. Zachary Vucic, "Shelton Announces New Space Situational Awareness Satellite Program," Air Force News Service, 24 February 2014, <http://www.af.mil/News/ArticleDisplay/tabid/223/Article/473403/shelton-announces-new-space-situational-awareness-satellite-program.aspx>.
29. Gruss, "U.S. Space Assets Face Growing Threat."
30. McDougall, *Heavens and the Earth*, 233.



Lt Col Kris Barcomb, USAF

Lieutenant Colonel Barcomb (BS, Clarkson University; MS, Air Force Institute of Technology; and MAAS, School of Advanced Air and Space Studies) is commander, 1st Air and Space Test Squadron, Vandenberg AFB, California, where he is responsible for leading a team of engineers, maintainers, and operators to evaluate and test a diverse array of innovative Air Force space capabilities. He is a career space professional and has held a range of positions across Air Force Space Command and the intelligence community spanning satellite operations, space systems acquisition, and research and development. He also led cyberspace planning and operations in support of multiple combatant commands as the chief of cyberspace strategy for Twenty-Fourth Air Force, Lackland AFB, Texas.

Let us know what you think! Leave a comment!

Distribution A: Approved for public release; distribution unlimited.

<http://www.airpower.au.af.mil>